UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,915	08/16/2000	Wilson P. Snyder II	9215/021	4050

36122 7590 12/31/2003

DUFT SETTER OLLILA & BORNSEN LLC
2060 BROADWAY
SUITE 300
BOULDER, CO 80302

EXAMINER	
SCHEIBEL, ROBERT C	

ART UNIT	PAPER NUMBER
2666	8

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/639,915	SNYDER ET AL.	
	Examiner	Art Unit	
	Robert C. Scheibel	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims **5, 7-9, 15, and 17-19** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 5 and 15 recite the limitation "first one of the priority levels and a second one of the priority levels" in line 23 of page 30 and lines 22-23 of page 32. There is insufficient antecedent basis for this limitation in the claim.

5. Claims 7-9 and 17-19 recite the limitation "the priority levels" in the following locations:

- Line 10 of page 31 (claim 7);
- Line 13 of page 31 (claim 8);
- Lines 16 and 17 of page 31 (claim 9);
- Line 11 of page 33 (claim 17);
- Line 14 of page 33 (claim 18);

- Lines 17 and 18 of page 33 (claim 19).

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims **1-4, 10-14, and 20** are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,373,846 to Daniel et al (hereinafter "Daniel").

Regarding claims **1 and 11**, Daniel discloses an integrated circuit ***(element 32 in figure 2, column 11, lines 18-19 "single-chip integrated circuit device 32")*** that processes a communication packet ***(column 11, lines 31-34)***, the integrated circuit comprising:

a core processor ***(APU 36)*** configured to execute a software application that directs the core processor to process the communication packet ***(column 11, lines 53-61 "The power of the ATMCSI/TU 32 comes from the inclusion within the chip of a user-programmable RISC central processing unit (referred to herein as a APU, or ATM processing unit). For this APU, user-selected firmware may be downloaded to the on-chip APU during a system reset, and controls most of the operational***

aspects of the ATMCSI/TU 32. That is, the APU 36 exercises executive control over the operations of most of the other elements in the ATMCSI/TU 32."); and

scheduling circuitry ***(Timer Unit 44 together with Scheduler Unit 46 in figure 2; this combination is referred to a the "time management team" (see column 34, lines 45-46))*** configured to retrieve first scheduling parameters cached in a context buffer for the packet ***(column 22, lines 13-16 "the scheduler 46 makes a request over a bus ... to obtain the first word of the given VCD"; the VCD is the context buffer which contains scheduling parameters such as the class field (see figure 7))*** and execute a first algorithm based on the first scheduling parameters to schedule subsequent transmission of the communication packet ***(column 35, lines 21-24 "the ATMCSI/TU 32, via the scheduler 46, implements a modified algorithm which computes a variable time interval in the future at which a cell transmission should next be scheduled")***.

Regarding claims **2 and 12**, in column 7, lines 9-11, Daniel discloses "multiple simultaneous algorithms may be run so that flow control may be determined by a selected or most advantageous method". This anticipates simultaneously running a second algorithm. Since Daniel teaches reading scheduling information as taught in the rejection above, it follows that the second algorithm would be implemented similarly by read scheduling information. Further, column 29, lines 35-40 indicate that the flow control algorithms discussed in Daniel are determining which VC to service next and are thus scheduling algorithms.

Regarding claims **3 and 13**, Daniel discloses integrated circuit of claim 2 wherein the first algorithm and the second algorithm comprise guaranteed cell rate algorithms ***(see column 34, lines 56-58 "the class of service known as variable-bit-rate service is usually used to transmit compressed video images without delay"; the modified GCRA algorithm described in column 35, lines 21-36 handles this type of traffic – since this algorithm is transmitting video, it is certainly referring to real-time VBR traffic and as such it guarantees a cell rate).***

Regarding claims **4 and 14**, Daniel discloses the integrated circuit of claim 1 wherein scheduling circuitry is configured to update the first scheduling parameters and write the updated scheduling parameters to the context buffer ***(see column 35, line 36 through column 36, line 2; the parameters described here are used in scheduling and are updated as described (for example, the LCT time))***.

Regarding claims **10 and 20**, Daniel discloses the integrated circuit of claim 1 wherein the scheduling circuitry is configured to operate in parallel with the core processor ***(see figure 2 indicates "the time management team" (timer unit 44 and scheduler unit 46) operating in parallel with the core processor (APU 36))***.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims **5 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,373,846 to Daniel et al in view of U.S. Patent 6,205,150 to Ruszczyk (hereinafter "Ruszczyk").

Daniel discloses the limitations of the parent claims 1 and 11 as discussed above.

Daniel does not disclose expressly the limitations found in claims 5 and 15 of attempting to schedule with a second (lower) priority and then attempting with a first (higher) priority if unsuccessful.

Ruszczyk discloses integrated circuit of claim 1 wherein the first scheduling parameters indicate a first one of the priority levels ***(the priority of the high priority queue 62)*** and a second one of the priority levels ***(the priority of the low priority queue 66)***, wherein the first priority level has a higher priority than the second priority level, and wherein the scheduling circuitry is configured to first attempt to schedule the transmission of the communication packet with the second priority level ***(column 6,***

lines 13-16 "Router 20 then schedules the lower priority data packet in low priority queue 66 using a weighted round robin scheduling method scheduler 68"), and if unsuccessful, then to attempt to schedule the transmission of the communication packet with the first priority level ***(column 6, lines16-20 "Once a transmission deadline of a lower priority data packet in low priority queue 66 has expired, a promoter 70 promotes the lower priority data packet to high priority queue 62 whereby the promoted data packet is scheduled by guaranteed scheduling method 64"; the expiration of the transmission deadline is the determination that the attempt at the second priority level is unsuccessful)***.

Daniel and Ruszczyk are analogous art because they are from same field of endeavor of packet scheduling.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Daniel to use a transmission deadline and to promote the priority of a packet from a lower to a higher priority when the transmission deadline expired at the lower priority.

The motivation for doing so is suggested in the abstract of Ruszczyk "This method ensures that lower priority data packets are not starved out of delayed in execution by higher priority data packets".

Therefore, it would have been obvious to combine Ruszczyk with Daniel for the benefit of preventing the starvation of lower priority packets to obtain the invention as specified in claims 5 and 15.

11. Claims **6 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,373,846 to Daniel et al in view of U.S. Patent 6,311,212 to Chong (hereinafter "Chong").

Daniel discloses the limitations of the parent claims 1 and 11 as discussed above.

Daniel does not disclose expressly automatically caching the scheduling parameters.

Chong discloses the integrated circuit of claim 1 wherein the first scheduling parameters are automatically cached by co-processor circuitry in the context buffer. ***(see the abstract which teaches caching of VCDs which contain scheduling parameters "the single-chip network processor includes an on-chip cache memory that stores VC descriptors for fast retrieval")***.

Daniel and Chong are analogous art because they are from the same field of endeavor of integrated circuits used in ATM switching.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Daniel by caching the VCDs. The motivation for doing so would have been to "enhance system performance" because "VCs are stored to the cache and retrieved much quicker from the cache than from the off-chip memory" as suggested in the abstract of Chong.

Therefore, it would have been obvious to combine Chong with Daniel for the benefit of improving system performance to obtain the invention as specified in claims 6 and 16.

12. Claims **7-9 and 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,373,846 to Daniel et al in view of U.S. Patent 6,327,246 to Jones (hereinafter "Jones").

Daniel discloses the limitations of the parent claims 1 and 11 as described above.

Daniel does not disclose expressly the limitation of a highest priority level being for CBR traffic (claims 7 and 17), a lowest priority level being for ABR traffic (claims 8 and 18), or a first priority being for real-time traffic and a second priority being for non-real-time traffic (claims 9 and 19).

Regarding claims 7 and 17, Jones discloses a highest one of the priority levels is for scheduling constant bit rate traffic ***(column 1, line 67 through column 2 line 3 "These include "constant bit rate" (CBR) service, which is the highest priority level...")***.

Regarding claims 8 and 18, Jones discloses a highest one of the priority levels is for scheduling constant bit rate traffic ***(column 1, line 67 through column 2 line 3 "...and available bit rate (ABR) service, which is the lowest priority level")***.

Regarding claims 9 and 19, Jones discloses a first one of the priority levels is for scheduling real-time traffic, a second one of the priority levels is for scheduling non-real-time traffic, and wherein the first priority level has a higher priority than the second priority level ***(column 1, line 67 through column 2 line 3 "These include "constant bit rate" (CBR) service, which is the highest priority level, two "variable bit rate" (VBR) services, and available bit rate (ABR) service, which is the lowest priority***

level"; it is well known that the CBR service is used for real-time traffic and the ABR service is used for non-real-time traffic).

Daniel and Jones are analogous art because they are from the same field of endeavor of ATM switching.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Daniel to explicitly handle the 4 services (CBR, 2 VBRs, and ABR) according to the priority hierarchy indicated in Jones.

The motivation for doing so would have been to properly "handle the cells according to their priority levels" as provided for in the ATM standard as suggested in Jones from column 1, line 65 through column 2, line 5.

Therefore, it would have been obvious to combine Jones with Daniel for the benefit of handling cells according to their priority to obtain the invention as specified in claims 7-9 and 17-19.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,533,020 to Byrn, et al and U.S. Patent 6,028,943 to Delp et al are cited due to their use of scheduling parameters similar to the present invention.

U.S. Patent 5,959,993 to Varma et al is cited due to the teaching of the use of multiple scheduling "disciplines".

U.S. Patent 6,091,709 to Harrison et al is cited due to the method of priority promotion it teaches.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert C. Scheibel whose telephone number is 703-305-9062. The examiner can normally be reached on 6:30-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 703-308-5463. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

RCS 12-18-03

Robert C. Scheibel
Examiner
Art Unit 2666

***

Seema S. Rao 12/29/03

SEEMA S. RAO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600